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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/885,527	06/21/2001	Jong-Woo Kim	053785-5018	2621

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EXAMINER	
CHUNG, DAVID Y	
ART UNIT	**PAPER NUMBER**
2871	

DATE MAILED: 10/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/885,527	Applicant(s) KIM ET AL.	
	Examiner David Y. Chung	Art Unit 2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 04 August 2003 .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-28 is/are pending in the application.

4a) Of the above claim(s) 18-28 is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-17 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Arguments

In view of the appeal brief filed on August 4, 2003, PROSECUTION IS HEREBY REOPENED. A new ground of rejection is set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) request reinstatement of the appeal.

If reinstatement of the appeal is requested, such request must be accompanied by a supplemental appeal brief, but no new amendments, affidavits (37 CFR 1.130, 1.131 or 1.132) or other evidence are permitted. See 37 CFR 1.193(b)(2).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. **Claims 1-6 and 9-13 rejected under 35 U.S.C. 102(e) as being anticipated by Kim (U.S. 6,255,130).**

As to claim 1, Kim (U.S. 6,255,130) discloses a method for manufacturing a thin film transistor array for a liquid crystal display and a photolithography method for fabricating thin films. Kim discloses the following steps: forming gate lines 22, gate electrodes 26, gate pads 24, and first capacitor electrodes 28 on a substrate; depositing a gate insulating layer 30, semiconductor layer 42, ohmic contact layer 57, and conductor layer 67; patterning the conductor layer 67 and ohmic contact layer 57 to form data lines 62, source electrodes 65, drain electrodes 66, second capacitor electrodes 68, and data pads 64; depositing a passivation layer 70; coating a photoresist on the passivation layer; exposing the photoresist to light through one or more masks having different transmittance between the display area and peripheral area to form a photoresist pattern having different thickness depending on the position. See column 15, lines 7-30. Kim discloses that the photoresist pattern can be formed using a single mask having different light transmittances. See column 9, lines 62-63. Figure 26A shows the active matrix substrate after patterning the passivation layer and forming the pixel electrodes 82. Note that the pixel electrode 82 electrically contacts the upper surface of the second capacitor electrode 68 through a contact hole 74 formed in the passivation layer 70.

As to claim 2, figure 1 shows the gate lines arranged perpendicular to the data lines to form a matrix pattern with the source electrode spaced apart from drain electrode.

As to claim 3, Kim discloses depositing and patterning a first conductive layer using a first masking step as shown in figures 17A to 17C. See column 13, lines 45-47.

As to claims 4 and 5, Kim discloses depositing a gate insulator layer, semiconductor layer, and second conductive layer and then patterning the second conductive layer using a second masking step as shown in figures 18A to 18C. See column 13, lines 48-60.

As to claim 6, Kim discloses patterning the passivation layer, semiconductor layer, and gate insulator using a third masking step as shown in figures 24A-25B. See column 15, lines 19-39.

As to claim 9, Kim teaches that the gate wiring may have a multi-layered structure, in which case it is preferably made of one material having low resistivity and another material having good contact with other materials. Double layers of Cr/Al (or Al alloy) and Al/Mo are the examples given. See column 7, lines 26-33.

As to claims 10 and 11, Kim teaches that both the gate insulator 30 and passivation layer 70 can be made of inorganic material such as silicon nitride. See column 7, lines 34-36 and column 8, lines 31-34.

As to claims 12 and 13, Kim teaches that the passivation layer can be made of insulating material such as acrylic organic material. See column 8, lines 31-34.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 7 and 14 rejected under 35 U.S.C. 103(a) as being unpatentable over Kim (U.S. 6,255,130) in further view of Park et al. (U.S. 6,287,899).

As to claim 7, Kim discloses data contact holes 73, gate contact holes 72, and capacitor contact holes 74 formed in passivation layer 70 as shown in figure 26A. Although Kim does not disclose exposing both a side portion and upper surface of the drain electrode, it was well known and obvious to do this in order to increase the contact area and form better electrical connection between the pixel electrode and drain electrode as shown in figure 15 of Park et al. Therefore, it would have been obvious to

one of ordinary skill in the art at the time of invention to expose both a side portion and upper surface of the drain electrode in order to form better electrical contact with the pixel electrode.

As to claim 14, Kim does not disclose making the width of the passivation layer smaller than the width of the data line. However, Park et al. discloses a redundant data line overlapping and connecting to the primary data line through a contact hole. See figure 4. It was well known and obvious that making the width of the passivation layer smaller than the width of the data line caused the side portions of the data line to be exposed. It was well known and obvious that exposing side portions of the data line increased contact area and improved the electrical connection to the data line. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to make the width of the passivation layer smaller than the width of the data line in order to improve electrical connection between the primary data line and a redundant data line.

3. Claims 8 and 15-17 rejected under 35 U.S.C. 103(a) as being unpatentable over Kim (U.S. 6,255,130) in further view of Park et al. (U.S. 6,335,276).

As to claim 8, Kim teaches that it is preferable for portion 114 of the photoresist pattern to have a thickness less than or equal to half that of portion 112, or for example, less than 4000 angstroms, and that this ratio depends on etch conditions. See column

9, lines 28-33. Park et al. discloses a similar device wherein the thickness of the thin portions of the photoresist pattern is preferably between 350 and 10,000 angstroms. See column 12, lines 21-23. Therefore, it is clear that the thickness of the photoresist pattern is a result effective variable. It would have been obvious to one of ordinary skill in the art at the time of invention to form the photoresist pattern such that the thin portions have a thickness between 800 and 900 angstroms, since it has been held that finding the optimal value of a result effective variable involves only routine skill in the art.

As to claims 15 and 16, Kim discloses using a mask having different light transmittances. Kim does not disclose that the light-shielding portion of the mask includes an opaque metal with low reflectivity. Park et al. discloses in figure 11, a mask having pattern layer 520. This layer is the same as the opaque pattern layer 320 shown in figure 9A. This layer is made of such material as chromium. See column 11, lines 5 – 10 and 30 – 40. It would have been obvious to one of ordinary skill in the art at the time of invention to use the mask of Park et al. in the manufacturing process of Kim because it allowed the photoresist layer to be patterned using a single photolithography step, making the manufacturing process more efficient.

As to claim 17, Kim and Park et al. do not disclose molybdenum silicide material in the semi-transmissive portion of the mask. However, molybdenum silicide was a common and conventional semi-transmissive material used in photomasks. It was well known and obvious for transmitting a suitably small percentage of light for most

photolithography applications. This allowed the difference between light and dark areas on the photoresist to be accentuated properly. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to form the semi-transmissive portion of the mask using molybdenum silicide in order to properly accentuate the difference between light and dark areas on the photoresist layer.

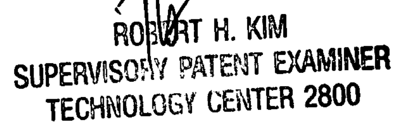
Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Chung whose telephone number is (703) 306-

0155. The examiner can normally be reached on Monday-Friday from 8:30 am to 5:00 pm.



David Chung
GAU 2871
10/16/03